

## LOWER BOWNS RESERVOIR



### Introduction

Lower Bowns Reservoir is an intermediate-sized reservoir on the east slopes of the Boulder Mountain in south-central Utah. It is sometimes spelled Lower Browns Reservoir, Lower B~~ow~~nds Reservoir, or simply referred to as Bowns Reservoir (Lower). Upper Bowns reservoir is usually known as Oak Creek Reservoir.

The reservoir shoreline is owned and administered by the Dixie National Forest with unrestricted public access. Defined beneficial uses include: water recreation excluding swimming, propagation of cold water species of game fish and aquatic life, and agricultural needs.

#### Characteristics and Morphometry

Lake elevation (meters / feet)	2270.1 / 7450
Surface area (hectares / acres)	36.4 / 90
Watershed area (hectares / acres)	7284.5 / 18,000
Volume (m <sup>3</sup> / acre-feet)	
capacity	1,665,227.5 / 1350
conservation pool	725
Annual inflow (m <sup>3</sup> / acre-feet)	
Retention time (years)	
Drawdown (m <sup>3</sup> / acre-feet)	
Depth (meters / feet)	
maximum	13.7 / 45
mean	4.6 / 15
Length (meters / feet)	792 / 2,600
Width (meters / feet)	381 / 1,250
Shoreline (km / miles)	2.133 / 1.33

#### Location

County	Garfield
Longitude / Latitude	111 16 12 / 38 06 35
USGS Map	Lower Bowns Reservoir, Utah 1985
Cataloging Unit	Fremont River (14070003)

### Recreation

Lower Bowns Reservoir is accessible FS-181, a gravel road intersecting the Boulder Mountain Highway (U-12) 1.5 miles south of the Wildcat Ranger Station. The intersection is 19 miles north of Boulder Town and 15 miles south of Torrey.

Fishing, picnicking and boating are possible at the reservoir. There is no boat ramp, however, and the

File Contains Data for  
PostScript Printers Only

reservoir is too small for waterskiing. The road is probably not maintained in the winter. Usage is moderately heavy.

Lower Bowns Reservoir Campground is adjacent to the lake and maintained by the Forest Service. primitive campsites, vault toilets and picnic areas. There are more developed USFS campgrounds along U-12, and an RV Park in Torrey. It can be seen from the overlook between mileposts 109 and 110.



### Watershed Description

Lower Bowns Reservoir is on a long, forested slope that begins at over 11,000 feet elevation at the crest of the Boulder Mountain. From the plateau top at 3,300 meters, the land drops off down to the Waterpocket Fold in Capitol Reef National Park at 1,600 meters. Lower Bowns Reservoir is near the bottom of the slope, and is only a short distance from U-12. While the immediate watershed is still forest, it is in the transition to arid desert, and Capitol Reef National Park can be viewed from several nearby knolls.

The watershed high point, a knoll above Stink Flats, is 3,402 m (11,162 ft) above sea level, thereby developing a complex slope of 7.6% to the lake. Although Lower Bowns Reservoir is an off-stream reservoir, it has a small natural watershed. Most of the water, however, comes from a diversion canal drawing water from Pleasant Creek, an adjacent stream, into the natural watershed. The outflow is in the Oak Creek Drainage. A substantial portion of the Pleasant Creek (and therefore Lower Bowns) drainage area is on the top of Boulder Mountain. The average stream gradient above the reservoir (including the short canals) is 6.7% (353 feet per mile).

The soil is largely of volcanic origin. Soil Associations that compose the watershed are found in Appendix III.

The vegetation communities are comprised of aspen, pine, spruce-fir, oak, alpine, maple, bitterbrush, mountain mahogany, pinyon-juniper and sage-grass. The

watershed receives 31 - 102 cm (12 - 40 inches) of precipitation annually with a frost-free season of 100 - 120 days at the reservoir.

Land use is multiple. The entire drainage area is on the Dixie National Reservoir and Forest.

### Limnological Assessment

The water quality of Lower Bowns Reservoir is good. It is considered to be soft with a hardness concentration

#### Limnological Data

Data sampled from STORET site: 595452

Surface Data	1979	1989	1991
Trophic Status	E	E	M
Chlorophyll TSI	-	47.84	45.78
Secchi Depth TSI	41.95	42.80	41.54
Phosphorous TSI	60.55	59.50	36.60
Average TSI	51.25	50.05	41.31
Chlorophyll a (ug/L)	-	5.8	4.7
Transparency (m)	3.5	3.3	3.6
Total Phosphorous (ug/L)	50	47	10
pH	8.8	9.3	9.5
Total Susp. Solids (mg/L)	-	-	1.5
Total Volatile Solids (mg/L)	-	-	5
Total Residual Solids (mg/L)	-	-	13
Temperature (°C / °f)	21/70	17/63	17/63
Conductivity (umhos.cm)	110	125	125

#### Water Column Data

Ammonia (mg/L)	0.03	0.01	0.03
Nitrate/Nitrite (mg/L)	.28	-	0.05
Hardness (mg/L)	55.3	-	60
Alkalinity (mg/L)	56	-	65
Silica (mg/L)	17.7	-	19
Total Phosphorous (ug/L)	100	57	12

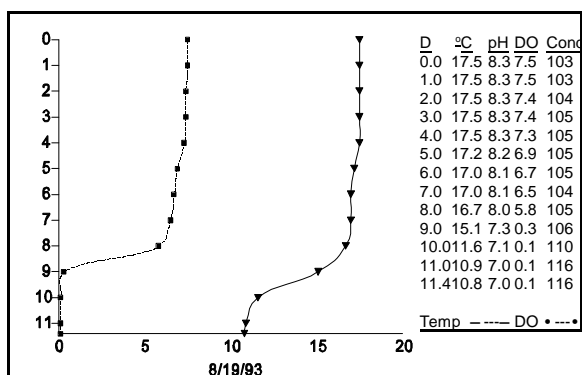
#### Miscellaneous Data

Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	0.4	7	5.6
Stratification (m)	4-7	NO	NO
Depth at Deepest Site (m)	14	8.0	4.0

value of approximately 58 mg/L (CaCO<sub>3</sub>). The parameters that have exceeded State water quality standards for defined beneficial uses are phosphorus, pH and dissolved oxygen. The average concentration of total phosphorus in the water column in 1979 and 1989 was 50 and 47 ug/L which exceeds the recommended pollution indicator for phosphorus of 25 ug/L, but in 1991 the concentration was only 10 ug/L. Dissolved oxygen concentrations due decline downward in the water column and below the thermocline go anoxic. This is not unusually for deeper impoundments but is evident that

## LAKE REPORTS

there is a large demand for oxygen in the hypolimnion and is impairing water quality conditions especially for a viable fishery. The pH values have historically been elevated and continue to range above the state standard of 9.0. This is not an atypical situation with algal blooms but in this reservoir elevated pH values extend throughout the water column. Due to a low alkalinity or buffering capacity the effects produced from algal activity may be extended for a longer period of time and more extensive in the water column. The reservoir appears to have a sharp thermocline near the 8 meter level. This stratification has a dramatic effect on water quality as is evidenced by the anoxic conditions. Current data indicates that the system is nitrogen limited. TSI values indicate the reservoir has shifted from an eutrophic system to a mesotrophic state. Additional data will need to be



obtained to determine if this is trend.

According to DWR no fish kills have been reported in recent years. The reservoir supports a populations of rainbow trout (*Oncorhynchus mykiss*). The lake has been treated for rough fish competition in 1954 and 1963. Populations of native fishes may still be present in the lake. The DWR stocks Lower Bowns Reservoir with 12,500 fingerling rainbow trout annually.

Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume% Density (mm <sup>3</sup> /liter) By Volume	
<i>Sphaerocystis schroeteri</i>	5.282	98.40
<i>Staurastrum gracile</i>	0.085	1.60
Total	5.367	
Shannon-Weaver [H']	0.08	
Species Evenness	0.12	
Species Richness	0.04	

The flora is fairly typical, but not particularly diverse. The dominance of green algae and diatoms indicates that the lake is reasonably healthy and has generally good water quality.

### Information

#### Management Agencies

Dixie National Forest	586-2421
Teasdale Ranger District	425-3435

#### Recreation

Red Cliff Oasis (Torrey RV Park)	425-3431
Six County Commissioners Association	896-9222

#### Reservoir Administrators

Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

### Pollution Assessment

Nonpoint pollution sources are: recreation, grazing, sedimentation and nutrient loading from grazing, and human wastes and litter from recreation. Cattle graze in the watershed and around the reservoir.

There are no point pollution sources in the watershed.

### Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

LOWER BOWNS RESERVOIR